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SHORT REPORT

The Use of Alternative Sources of Autologous Vein for Infrainguinal Bypass

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Key Words: Infrainguinal bypass; Arm veins; Femoro-popliteal vein.

Introduction

The ipsilateral long saphenous vein (LSV) is the optimal conduit for infra-inguinal bypass.[1,2] When it is unusable a prosthetic graft may be used but patency is poor for below-knee bypass.[1,2] Alternative autologous vein (AAV) sources such as contralateral LSV, short saphenous, arm or superficial femoro-popliteal veins (SFPV) may be preferable[1,3,4] but several segments may require splicing to achieve sufficient length, prolonging and complicating the procedure. The outcome of preferential AAV use for infrainguinal reconstructions when LSV is unavailable is presented.

Methods

Of 261 infrainguinal reconstructions between 1994 and 2002, ipsilateral LSV was used in 148 (78 femoro-popliteal, 70 femoro-tibial or pedal) and PTFE in 43 (34 femoro-popliteal, 9 femoro-tibial). AAVs were used for 70 reconstructions in 62 limbs (61 patients: 45 men, 16 women; mean age 70 years, range 45–92 years).

Thirty-seven AAV bypasses were primary reconstructions for critical ischaemia (35) or disabling claudication (2) whereas 33 were revisions for stenosis (15), occlusion (12), graft rupture (4) or false aneurysm (2). Fifty-four bypasses were femoro-tibial, 7 femoro-pedal and 9 femoro-popliteal. Twenty-five used a single vein and 45 had multiple spliced segments (Table 1). Arm veins were used in 64 and SFPV in 12. Ipsilateral LSV was combined with AAVs in 25. The basilic was preferred to cephalic vein because of its greater calibre and its infrequent use for intravenous infusions. No preoperative vein mapping was performed and all grafts were reversed.

Patients were followed clinically and by duplex surveillance from 1–75 months (Mean 23 months). Two were lost to follow-up within 6 months.

Patient survival, limb salvage and graft patency (primary, primary assisted and secondary) were assessed by life-table analysis and group comparisons performed by Cox proportional hazards using a commercial software package (SYSTAT 10.0, SPSS Inc, Chicago, Ill, U.S.A.). For patients undergoing multiple revisions, patency was taken from the first using AAV, giving 62 grafts for survival analysis.

Table 1. The source of alternative vein in 70 infrainguinal reconstructions.

Single source	25
Basilic	21
Cephalic	2
SFPV	2
Spliced veins	45
LSV/basilic	12
LSV/cephalic	2
Basilic/cephalic	16
LSV/basilic/cephalic	5
SFPV/basilic	3
SFPV/basilic/cephalic	1
LSV/SFPV	4
LSV/SFPV/basilic	2

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Results

Thirty-day mortality was 4.3%. One deep vein thrombosis occurred and one patient developed an ischaemic contracture, despite fasciotomy, following reconstruction for acute ischaemia. There were 16 (23%) postoperative wound infections including 5 (7%) requiring revision for exposed or ruptured grafts and four persistent lymph leaks. Two patients developed decubitous heel necrosis. Temporary leg oedema after SFPV reconstructions was similar to LSV grafts but was severe in two cases. Transient upper limb oedema frequently followed arm vein harvesting.

Nine irreversible graft thromboses resulted in 5 major amputations within 6 weeks. Of 21 later graft thromboses 5 were salvaged by surgery and 16 resulted in major amputation. Seven graft stenoses were revised surgically and 7 by percutaneous angioplasty.

Patient survival, limb salvage and graft patencies are shown in Figure 1 and Table 2. Results resembled those of 124 femoro-tibial grafts performed for critical ischaemia using LSV in our unit (Limb salvage 84%, secondary patency 76%, primary assisted patency 66%, primary patency 41% at 1 year). Splicing conferred no significant disadvantage but numbers were relatively small.

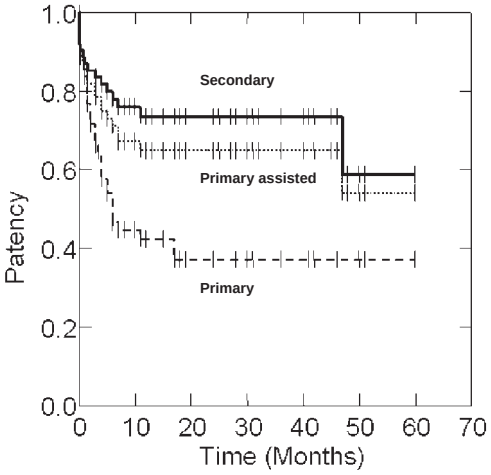

Fig. 1. Primary, primary assisted and secondary patency of infrainguinal grafts using alternative sources of autologous vein. (Each vertical stroke represents the time length of observation of a single graft. The numbers at risk may therefore be calculated at a given time interval by the number of vertical strokes beyond that point.)

Table 2. Patient survival, limb salvage and graft patencies for patients undergoing 62 infrainguinal grafts with alternative veins (numbers at risk in parenthesis).

	30 days	1 year	2 years
Patient survival	95% (60)	87% (40)	76% (27)
Limb salvage	94% (56)	85% (34)	79% (24)
Secondary patency	87% (53)	73% (30)	73% (19)
Primary assisted patency	85% (52)	65% (28)	65% (17)
Primary patency	84% (52)	42% (17)	37% (11)

Discussion

Whilst AAVs gave acceptable primary assisted and secondary patency and limb salvage, primary patency was disappointing because of stenoses occurring within 6 months. Subsequent patency remained acceptable and similar to LSV tibial bypass results.

AAV bypass patency varies greatly between observers[1,5–8] but is generally superior to PTFE.[9] Variations in graft surveillance and peroperative angioscopy may explain some of the differences. Splicing had no effect in some series[6,7] but was deleterious in another.[8] SFPV have previously been used for femoropopliteal bypass,[4] which was extended here to distal reconstructions.

Superior graft patency may justify the increased operative time for AAV compared with prosthetic bypass[9] but a multicentre randomised controlled trial is required for a definitive answer.

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